CHARLOTTE WATER

Donated Projects Plan Review Checklist

The following should be included if applying for public water/sewer through Donated Projects:

- Two sets of plans (on 24x36 – ARCH D size)
- Topo map showing the drainage basin, topo lines with elevations at every 10 ft labeled, and your project (proposed sewer, existing sewer, property lines, and streets)
- Copy of as-builts (can be obtained by emailing cmuasbuilts@ci.charlotte.nc.us)
- Check for plan review/inspection fees (these are collected up front and review will not begin until plan review fees have been paid)

Cover Sheet (General)

1. Use CLTWater title block
2. Scales: For SF/MF Use 1:40, 1:50, 1:60, 1:100 or 1:200 (for large subdivisions)
   For Commercial/Industrial use 1:40, 1:50, 1:60 or 1:100
3. Show entire project boundary, connecting streets, North arrow, adjacent properties with the house (address) number, tax parcel ID number, note who owns the existing streets (CDOT, SR #, or private, or town maintained), note who will maintain the proposed streets
4. CLTWater Donated Projects General Notes, CDOT note (if applicable) and towns, CLTWater legend
5. Design company, survey company, developer information including contact person and email addresses, and block for Plan Reviewer name
6. Vicinity map showing project location (can be a dot, arrow, hatch, etc) and closest major thoroughfare intersection with the major streets labeled and North arrow. Vicinity map does not have to be to scale.
7. Typical street cross sections can be shown on the cover sheet if space is available. If no room on cover sheet then put the cross section on the permit sheet. The street cross sections should include building setback lines, location of proposed water lines, water meters, dimensions of: sidewalks, planting strips, pavement, right-of-ways, parking lanes, and additional CLTWater easement (if applicable)
8. Sheet index: Street names, trunk lines designated by manhole numbers and STA numbers on each sheet
9. Duke Power, railroad, and gas right-of-way widths (if applicable) with deed book and page number
10. Do not show sidewalks, planting strips, sewer laterals, water services (for ¾" residential meters), storm drains, small gas main (4" and smaller), underground electric, underground telephone, fiber optic, underground cable, overhead electric (unless if large transmission line) for anything larger than 40 scale
11. Add "MUNICIPALITY:_____, NCDOT ENCROACHMENT NO. _____, CDOT PERMIT NO. _____, and NCDEQ PERMIT NO. _____" if applicable
12. Label all existing water/sewer features (examples provided below):
    a) For existing water/sewer lines label as existing, size of main, job number, and file number.
    b) Label all Fire Hydrants (proposed or existing) and include the GIS identification number for existing Fire Hydrants.
    c) For all existing mainline valves and fire hydrants include the GIS identification numbers.
    d) For all existing manholes include the GIS identification numbers.
13. Use sheet designations for larger projects (5 sheets and up)
14. Add CLTWATER PLAN REVIEWER and INSPECTOR NAME

Cover Sheet (Sanitary Sewer)

1. Existing sewer line sizes, manholes (not shaded), sewer right-of-ways (not shaded) and widths, flow directions, CLTWater job numbers, file numbers and CLTWater sewer GIS ID# (provided by CLTWater with as-built request)
2. Proposed sewer line sizes, manholes (shaded) numbered consecutively beginning with the first proposed downstream manhole (should start with the EX MH and first proposed manhole will start with MH-1 and numbered consecutively from there even in a new phase we restart the numbering back to 1). For on-street sewer provide the length of sewer for off-street sewer provide length of sewer and the bearings. Provide the MH#'s for both on and off-street sewer on the cover sheet.
3. Proposed sewer right-of-ways (shaded), widths and bearings on off street sewer

Cover Sheet (Water Distribution)

1. Existing water lines, sizes, valves (not shaded), fire hydrants (not shaded), CLTWater job numbers, file numbers and CLTWater water GIS ID # (provided by CLTWater with as-built request)
2. Distance to existing fire hydrants (not shaded) and existing shut-off valves (not shaded) at tie in locations (i.e. next GV or BFV location) with GIS ID#'s
3. Proposed water lines bolder than road features, sizes, lengths, fire hydrants (shaded) and valves (shaded)

Permit Sheet

1. Complete all applicable information
2. NC Professional Engineer Seal, Sign and date permit form
3. Typical street cross section if applicable

Plan Sheets (General)

1. Do not fill in revision boxes until the plans have been permitted and the plans need to be revised. Please give a brief description of what triggered the revision (e.g. shifted lot line at lot 35 & 36).

Water Distribution Sheet

1. Entire project on one sheet (if possible) using 1"=40', 1"=50', 1"=60' and 1"=100' for single family sites and maximum of 1"=50' scale for multifamily or commercial sites (see Cover Sheet (General) section for additional acceptable scales)
2. Details of 1"=40' scale required for construction in existing road right-of-ways, at bore locations or complex work zones (Scales of 1:10, 1:20, 1:30, and 1:40 are acceptable for complex work zones)
3. Typical street cross sections (if not on cover sheet or permit sheet) including building set back lines, location of proposed water lines, water meters, dimensions of: sidewalks, planting strips, pavement, right-of-ways, parking lanes, and additional CLTWater easement (if applicable), and buildings if applicable
4. Label existing water lines, sizes, valves (not shaded), tees, crosses, and significant appurtenances, distance to existing fire hydrants (not shaded), distance to existing shut-off valves (not shaded) at tie-in locations, CLTWater job numbers, file numbers, and CLTWater GIS ID # (provided by CLTWater with as-built request)

5. Label proposed water lines (show bolder than road features), length of each size every street, distance from back of curb, valves (shaded), fire hydrants (shaded), tees, crosses, bends, lengths of restrained joint ductile iron pipe and calculations per DIPRA program. Show water meters (not to be located in future driveways) including irrigation meters; label if larger than 5/8" or ¾"
6. Sidewalks, planting strips, parking lanes shown and widths labeled
7. Gate valves and fire hydrants located at curb radius points in intersections (10' from curb RP if ADA ramp is required), gate valves 3' from tees or crosses at other locations
8. Gate valve required at change in pipe diameter, 2 gate valves at tees, 3 at crosses
9. Maximum of 10 lots on dead-end 2-inch main, 20 lots on looped 2-inch main
10. Water main alignment designed on the same side of the road the entire length unless a variance is allowed by CLTWater. Should be opposite side of road from storm sewer.
11. Water line terminates 10' past the property line (driveway when applicable) in cul-de-sacs
12. Water line terminates at the end of pavement/sidewalk on stub streets
13. Connect all water lines within the project except cul-de-sacs and temporary ends
14. Profiles required for 16-inch and larger water lines; air releases at high points. Water line stationing is required for mains 16" and above and should match the profile. STA 0+00 should start with an existing BFV or GV. Projects in CBD and complex worksites require stationing and profile. Engineer may require stationing and profile as needed (e.g. creek crossings, culverts, high pressure gas mains).
15. Water mains should generally be 1' inside of the sidewalk and 3' deep based on edge of pavement (not back of curb or sidewalk).
16. A net 15' easesment is required for all proposed water mains. For example, if a proposed water main is 5' from the R/W line we would require a 10' easement behind the R/W line. No buildings/structures of any kind are permitted in our easement.
17. Water/storm drain crossing elevations (including ground) for 24" and larger storm pipes
18. Profiles and cross sections required when water main is near large culverts or retaining walls. Retaining wall tie-back geogrid influence area must be clearly indicated; water main must be located outside influence area
19. Water lines shall not be no closer than 15' from buildings/building setback line
20. Show BMP's, detention ponds, and sediment basins if applicable. Please note that BMP's cannot overlap CLTWater's easement. Our easement shall not overlap earthen impoundment.
21. If water line is inside NCDOT R/W the proposed water line cannot be more than 10' deep without getting an active shoring detail from a Geotechnical Engineer. This will only be approved on a case by case basis. In general, if a water line is 3' deep it must be a minimum of 8' off edge of pavement due to the states' 1:1 + 5' rule. Water mains must be 3' deep based on edge of pavements. Valves and Fire Hydrants are not to be placed in ditch lines or side of ditch lines and near culverts. To get an encroachment from NCDOT please send the following:
    a. NPDES-1 Form signed and sealed by engineer
    b. Typical trench detail (must show depth, distance off edge of pavement, and distance from R/W line)
    c. Bore pit with receiving pit detail (must show the depth of bore pit and receiving pit, distance off edge of pavement, distance from R/W line, width of pavement, depth of utility line, and length of utility line) if applicable
    d. Encroachment map on legal size sheet
    e. Traffic Control Plan if inside 1:1 or pavement cut is required
22. All water meters/services shall be perpendicular to the main and meters directly in front of the property. If lot lines move meters and services may have to be moved to serve the proposed parcel.

23. We accept the following configuration for commercial and residential services:
    a. For commercial settings we accept splits off of a fire line for irrigation and fire
    b. For residential settings we accept splits off of service line for irrigation and domestic
    c. If main is back of curb we accept individual taps. If main is in the street we accept one tap with split services for the site.
24. Hatch sidewalks using concrete hatch
25. Developer is responsible for acquiring pavement degradation permits and paying applicable fees. For CDOT roads, developer is responsible for obtaining CDOT R/W use permit before beginning construction.
26. Provide elevation crossings for proposed water over existing sewer

Sanitary Sewer Plan and Profile Sheets

1. 1"=40' horizontal and 1"=4' vertical scales
2. Plans begin at existing sewer system and progress with proposed manhole (shaded) numbering and stationing in ascending order
3. CLTWater sewer GIS ID # on existing sewer (provided by CLTWater with as-built request)
4. Match lines at manholes only, label corresponding sheet numbers in plan view
5. Profile view should be directly over plan view when possible and run left to right (downstream to upstream)
6. Show and label (per CLTWater legend) existing road features: utilities, trees, mailboxes, driveways, roadside ditches, culverts, retaining walls, etc. for extensions that parallel existing roads and at connection points. Retaining wall tie-back geogrid influence area must be clearly indicated; sewer main and easement located outside influence area
7. Sewer mains should not cross under retaining walls; when allowed by CLTWater under hardship conditions, casing pipe is required within influence zone
8. Label bearings, distances, flow directions, and sewer right-of-way widths (shaded) on all sections of proposed off street sewer
9. Adjacent property owner information including house number (address) and tax parcel ID number
10. Provide recorded document if proposed sewer is to be installed in existing easement
11. Drainage patterns that continue beyond the limits of the project must be served by providing acceptable horizontal and vertical locations of the proposed sewer system and dedicating any necessary easements within the project beyond the CLTWater required termination point of the pipe. Include profile 300' past the project property line
12. Outfalls that parallel creeks should be designed with the top of pipe a minimum of 2' below the creek flow line (show/label in profile) and with horizontal consideration of Streamside Zones (show/label in plan view). Manhole rims or vents must be 2' above the 100 year flood elevation (show/label in profile). Manholes and all sewer shall be minimum 10' off top of bank.
13. Outfalls that parallel impounded water (lakes and ponds) shall be ductile iron pipe when more than 6 feet below full pond. Anti-seep collars required to prevent groundwater movement along trench; bedding shall be flowable fill to spring line
14. Sewer systems should terminate in a street with the exception of trunk lines that will be extended along a drainage pattern in the future
15. Manholes in subdivision streets located a minimum 4' from center of manhole to proposed curb, pipe a minimum 2' from center of pipe to curb, manholes in stub streets terminate 7 ½' inside edge of pavement
16. Match crown of smaller pipe to crown of larger pipe
17. Drop manholes require 5' from rim/grade to top of incoming pipe (label elevation) and a minimum 2 ½' outside drop structure from bottom of pipe to invert "in" elevation at the manhole base; .2 drop is required through manholes on 15-inch and smaller diameter mains
18. 8" SS min slope is 0.60% and must include 0.20 ft drop in the manhole

19. Inside drops are allowed in 5'diameter and larger manholes; unpiped inside drops are not permitted
20. Note size if larger than 4-inch. Sewer laterals are not permitted in driveways but should be located as close to center of lot as possible.
21. Slopes calculated to 2 decimal points (.00)
22. Show storm drain systems, sizes and easements in plan view; inside and outside diameter of parallel storm drain and crossings in profile view
23. Label all inverts (including outside drop information when applicable) at manholes with multiple intersecting pipes and manhole number for each incoming pipe
24. Label type of frame and cover for each manhole in plan view. Labeling preference for manholes should be MH#, STA#, and F&C type in that order.
25. Sewer pipe depths exceeding 14' will not be acceptable in most cases especially for on-street sewer. Off-street/trunk sewers are subject to CLTWater approval.
26. Provide road profile 300' past the property line at stub streets
27. Show water lines, sizes, and fittings; reference Water Distribution Sheet number for detailed labeling
28. Sewer lines that terminate at a proposed subdivision entrance must be designed at an acceptable vertical and horizontal location to allow future street main extensions along the existing road. The terminal manhole shall be located on the shoulder of the road if subject to future extension.
29. Show/label water lines, gas mains, utility crossings information in profile
30. Clearly indicate any planned/future community pool site; the lateral that serves the pool must be 4-inch diameter only. A separate lateral for other pool/clubhouse facilities may be larger than 4-inch if necessary
31. If sewer is inside NCDOT R/W the proposed sewer cannot be more than 10' deep without getting an active shoring detail from a Geotechnical Engineer. This will only be approved on a case by case basis. In general, if a sewer manhole is 10' deep it must be a minimum of 15' off edge of pavement due to the states' 1:1 + 5' rule. Manholes are not to be placed in ditch lines or side of ditch lines and near culverts. To get an encroachment from NCDOT please send the following:
    a. NPDES-1 Form signed and sealed by engineer
    b. Typical manhole detail (must show depth, distance off edge of pavement, and distance from R/W line)
    c. Bore pit with receiving pit detail (must show the depth of bore pit and receiving pit, distance off edge of pavement, distance from R/W line, width of pavement, depth of utility line, and length of utility line)
    d. Encroachment map on legal size sheet
    e. Traffic Control Plan if inside 1:1 or pavement cut is required
32. Sewer lines shall not be no closer than 10' from buildings unless installed with DIP.
33. Show BMP's, detention ponds, and sediment basins if applicable. Please note that BMP's cannot overlap CLTWater's sewer easements. Our easement shall not overlap earthen impoundment.
34. Sewer cleanouts are not allowed within a public R/W. If there is not enough room to place the cleanout behind the R/W line then a private manhole in the R/W line must be installed.
35. DIP laterals are to be used when the clearance between the storm drain and lateral is less than 24". If the lateral is within 18" of a WM then both the lateral and WM need to be DIP. If the sewer lateral is to be installed over top of the storm drain then the lateral must be DIP.
36. All sewer laterals shall be perpendicular to the mains and cannot be any closer than 7' apart except at terminal manholes. No more than four holes per MH. Terminal manholes have a maximum of 3 taps. 4" laterals cannot be no closer than 35°.
37. SSE's paralleling streams should be 10' from edge of easement to TOB. At stream crossings, the manholes and sewer mains shall be 10' from TOB. No easements shall be located in SWIM buffer unless approved by the engineer.
38. If sewer is installed between lots and within 20' of proposed homes then the sewer lines shall be DIP with a minimum 30' SSE or 15' SSE the width of the proposed home and taper out to a 30'

SSE when sewer extends past the edge of the structure. Sewer shall be installed in Type III stone bedding. The DIP shall run from the rear of the property line to the street R/W line at a minimum. A variance for the DIP requirement may be granted with additional easement width subject to CLTWater approval.

39. Hatch sidewalks using concrete hatch.
40. For off-street sewer where fill is to be added use DIP.

Maximum Depth of Cover - DIP				
Pipe Size	Pressure Class	Bedding		
		Type I	Type II	Type III
8"	350	20'	34'	50'

For other sizes please refer to the Sewer Specifications/Details on Page XV-31 in the Design Manual.

41. Existing sewer with proposed fill will require plan and profile. Must clearly indicate proposed fill over existing sewer main.

Low Pressure Sanitary Sewer (LPSS)

The following will need to be included in your submittal:

1. ASEA 04-16 (http://deq.nc.gov/about/divisions/water-resources/water-resources-permits/wastewater-branch/collection-systems/sewer-extension-permitting) – **1 original, 1 copy**
2. FTSE 04-16 (http://deq.nc.gov/about/divisions/water-resources/water-resources-permits/wastewater-branch/collection-systems/sewer-extension-permitting)
3. Developer Operational Agreement (DEV) or Homeowners Operational Agreement (HOA) if applicable (http://deq.nc.gov/about/divisions/water-resources/water-resources-permits/wastewater-branch/collection-systems/sewer-extension-permitting)
4. Watershed Stream Classification Form: WSCAS 01-15
5. Sketch of your LPSS model showing the nodes used
6. Three year power outage history for the area being served from power company (Duke Energy, Town of Pineville, etc.)
7. FIRM Map (can be obtained from our POLARIS webpage)
8. Grinder Pump Specifications
9. Customer Brochure (must include pump tables for all lots and copy of CLTWater's Standard Details #5 & #8) – **2 copies**
10. Application Fee $480.00 payable to NCDEQ (if not using express permitting)
11. Site Map (USGS map)
12. Detailed Plans – **2 copies**
13. Engineering Report – **2 copies**
    a. Cover Page sealed by PE
    b. Table of Contents
    c. Cover letter to NCDEQ (tell them what you are submitting and how much the check amount is)
    d. Form ASEA 04-16
    e. Form FTSE 04-16
    f. Form WSCAS 01-15
    g. Site topographic map (USGS maps are great)
    h. Project Narrative (describe the project, location, and any unique features about the project)
    i. Model calculations (computer model print out) and pump curves
    j. Sketch of model and all zones and nodes labeled (should match the model calculations)

CHARLOTTE WATER

k. Flow calculations
l. Letter/email from power company outlining the power outage history for the past three years
m. Wetwell reliability requirements calculations (there should be sufficient storage in the wetwell for the longest period of time the power was out)
n. Flotation resistance calculations (concrete ring around the wetwell)
o. Flood Insurance Rate Map (FIRM) available for download on POLARIS
p. Variance letter (ask your plan reviewer for a copy of this letter)
q. Grinder pump, wetwell, controls, and alarm specifications

14. Overall LPSS sheet (shows the overall big picture of the LPSS with the nodes labeled so they can be matched up with the model that was used, and zones labeled)
15. Model used to design the LPSS system (i.e., copy of the WaterCAD, SewerCAD, or Excel file used to design the system)

In addition to what is already required on the gravity sanitary sewer plans each plan sheet should include the following:

1. Pump tables for each lot shown on the sheet (example below)

PUMP INFORMATION LPSS – (STREET NAME)				
ADDRESS (OR LOT #)	TAX PARCEL ID NO.	APPROX. PUMP ELEVATION	PUMP DESIGN POINT (GPM/TH or TDH) SHUT OFF TH = XXX	APPROX. TOP OF WET WELL ELEVATION
9300	199-391-18	570.76	28.06 GPM – 39.63 TH	576.26
9316	199-391-17	588.23	26.54 GPM – 43.35 TH	593.73
9332	199-391-16	585.59	17.34 GPM – 60.22 TH	591.09

2. Show the “BASE FLOOD ELEV = _____” on each plan sheet
3. Include the following notes for the grinder pumps used:
    1. PUMP CURVE FROM MYERS WGL20 2 HP DUAL SEAL GRINDER WITH 4-1/2” IMPELLER USED TO DETERMINE FLOW RATE.
    2. WETWELL FOR THE RESIDENTIAL GRINDER SHALL BE 3’ DIA. x 6’ DEEP.
    3. SERVICE BOX TO BE LOCATED DIRECTLY OUTSIDE OF R/W OF (NAME OF STREET)
    4. EACH SERVICE INSTALLED ALONG (NAME OF STREET) SHALL BE 1-1/2” PER CLTWATER STANDARDS.
    5. GRINDER PUMP WETWELL SHALL HAVE WATER TIGHT COVER WITH A VENT 2’ ABOVE THE BASE FLOOD ELEVATION.
    6. POSITIVE DISPLACEMENT PUMPS ARE NOT PERMITTED.
4. When designing the LPSS system do not use 190 gpd for your flows. Use 250 gpd/lot per NCDEQ requirements.

The LPSS line should be sized to serve all future extensions and should be included in the model. A separate sewer sheet showing the overall area and a table for all lots with the appropriate size grinder pump shall be included. Examples can be provided upon request.

To determine the flow rate for LPSS we use:

$$Q = 15 + \frac{1}{2}D$$

Q = Flow in gpm
D = Number of dwelling units

Regional Pump Stations

1. Drainage basin map showing the entire drainage basin the pump station is intended to serve, the projected flows for the drainage basin, and proposed flows for the project. If drainage map cannot fit on one sheet call Donated Projects to discuss the scale to be used.
2. Fee Simple Deed for the entire pump station site deed to the City of Charlotte (must include the pump station site, overflow containment basin, area around the basin to adequately maintain it, access road, truck turnaround, and access up to a public street)
3. Operation and Maintenance Manuals
4. Engineer's report/calculations
5. Electronic file used to model the pump station
6. Shop drawings required for all pump station (PS) and force main (FM) components.
7. Electrical drawings for PS
8. Shop drawings for terminal points for tracing wire system. Terminal points are required no more than 1,000 ft intervals.
9. Shop drawings for FM markers

APPROVED BY:

Steve Buchanan, P.E.
Donated Projects Manager/Senior Engineer

Date: January 12, 2017